



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application Of:
J. Roger Kelley

Serial No.: 09/849,078

Filed: May 4, 2001

Title: REGULATORY ONLINE
MANAGEMENT SYSTEM

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Attorney Docket No.: 121948.0001.003

Group Art Unit: 2177

Examiner: Leslie Wong

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Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO OFFICE ACTION DATED MAY 13, 2004

This correspondence is being filed as a full response to the Office Action of May 13, 2004.

Applicant respectfully requests entry of the following arguments/submissions and consideration of the appended remarks for fulfillment of the requirement under 37 CFR 1.105.

This response is being filed in conjunction with a 3-month Petition for Extension of Time. Please charge \$490.00 to the Deposit Account 10-0096 to satisfy the three-month Petition for Extension of Time fee.

REQUIREMENT UNDER 37 CFR 1.105

The Examiner has determined that it is reasonably necessary to the examination of this application for the Applicant to provide certain information under 37 CFR 1.105. The Examiner is requiring the Applicant to provide any information including the EPA Document AP-42 reference regarding the following claimed emissions formulas: hydrocarbon emissions from storage tanks, hydrocarbon emissions from internal combustion engines, hydrocarbon emissions from external combustion units, glycol dehydration units, flash emissions caused by the transfer of higher pressure liquids from a process vessel to a storage tank of less pressure, loading loss emissions, and emission fees.

In response to the requirement under 37 CFR 1.105, Applicant provides copies of sources for formulas used in the example section of the patent and attaches sample calculations as they would appear in an emissions inventory document generated by the Regulatory OnLine Manager Program.

Some of the formulas used in the example section of the patent were obtained from Compilation of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources. U.S. Environmental Protection Agency, Research Triangle Park, NC, January 1995. Specifically, the emissions formula for hydrocarbon emissions from external combustion units can be found in Chapter 1, Section 1.4. The emissions formula for hydrocarbon emissions from internal combustion engines can be found in Chapter 3, Section 3.2. The emissions formula for loading loss emissions can be found in Chapter 5, Section 5.2. Finally, the emissions formula for hydrocarbon emissions from storage tanks can be found in Chapter 7, Section 7.1. The relevant sections of the cited source is included as an attachment to this response.

The other emissions calculations are accomplished using varying methodology and references as dictated by the regulatory requirements of the resident state and the governing regulatory agency.

The emissions for flash emissions caused by the transfer of higher pressure liquids from a process vessel to a storage tank of lesser pressure may be calculated using 1) standard petroleum engineering calculations, e.g. Vaquez-Beggs Gas Oil Ratio and Black Oil GOR, 2) standard testing of samples and gas oil ratio calculation from gas evolved during this test or 3) API - E&P Calculation routine using industry standard software. The above mentioned methods are described below.

1) Standard Petroleum Engineering Calculations

a) Vasquez- Beggs Formula

$$GOR = C1 * SG100 * (Pstr + Patm) C2 * E^{(C3 * ^\circ API)/(Tgas^\circ F + 460)}$$

$$SG100 = SG * (1.0 + 5.912 * 10^{-5} * Tgas^\circ F * \log((Psep + Patm)/114.7))$$

Where: GOR = Gas Oil Ratio of the stored fluids in scf per bbl
 C1,C2,C3 = Empirical constants
 SG = Specific Gravity of the gas
 SG100 = Specific gravity of the gas referenced to 100 psig
 Pstr = Pressure of the upstream fluid
 P atm = Atmospheric pressure
 Tgas = Temperature of the gas in the tank overheads
 Psep = Operating pressure of the separator

b) Black Oil GOR Method

$$\log Rst = 0.4896 - 4.916 \log \gamma_{out} + 3.496 \log \gamma_{sp} + 1.501 \log Psp - 0.9213 \log Tsp$$

Where: Rst = Stock tank GOR
 γ_{ost} = Oil specific gravity
 γ_{sp} = Separator gas specific gravity
 Psp = Separator pressure
 Tsp = Separator temperature

2) Standard Testing of Samples and Gas Oil Ratio Calculation From Gas Evolved During This Test

The lab will collect liquid hydrocarbon samples at the separator at the actual temperature and pressure of the vessel. These samples will be analyzed to determine the volumetric evolution of gas as well as the constituent concentrations in the gas evolved. This data will allow the program to calculate the total volume of gas “flashed” from the pressure drop to the tank and to determine the tons per year of constituent volatile organic hydrocarbons that are in this flash gas.

3) API - E&P Calculation Routine Using Industry Standard Software

The API calculation method is an industry accepted routine that estimates the flash hydrocarbon emissions based on empirical observations and constants that approximate the flash emissions using physical characteristics of the fluid and the pressure and temperature of the affected vessels.

The emissions for glycol dehydration units are calculated using a standard industry model, the equations for which are not readily available. However, the printout for the output of this model is included with the sample calculations and is labeled as Attachment No. 5.

Finally, the emission fees are calculated under the direction of the individual states which require the fees, i.e. the fees are usually charged per ton of emissions. An example of an emission fees formula is as follows:

$$\text{\$35.00 per ton per year} \times 250 \text{ tons total emissions} = \text{\$8,750 total fees}$$